

REMARKS

In response to the Office Action mailed April 15, 2004, Applicants amend their application and request reconsideration. In this Amendment claims 1-8 are cancelled and are replaced by claims 9-20.

There was an extensive rejection as to the form of the examined claims and corresponding objections. These rejections and objections are moot in view of the cancellation of the examined claims.

Numerous prior art rejections were made with respect to the examined claims, based upon Bacon et al. (U.S. Patent 4,466,864, hereinafter Bacon), Landau (WO 99/54527), and Reid et al. (U.S. Patent Application 2001/0015321, hereinafter Reid). Examined claims were rejected as anticipated by these references and as obvious in view of various combinations of these references. These rejections are not applicable to the claims submitted here.

The invention as defined by the newly submitted claims focuses on and is supported by the description in the patent application from page 5, line 17, through page 6, line 9. In the particularly described embodiment, electroplating is carried out by passing a complex, alternating current between an object being plated and an electrode. In a first part of the alternating current cycle, a positive current flows and in the second part a negative current flows. This current is characterized as a waveform. Particular attention is focused on the positive part of the current flow in which an initial current is supplied and that current gradually declines at a constant rate during the first part of the cycle. Thus, the base waveform resembles a triangle. Spikes of current are superimposed on this triangular waveform in the first half of the cycle of the alternating current flow. In the second half of the cycle, in the described embodiment, the current flow is substantially uniform in magnitude. While reference is made here to "halves" of the cycle, there is no intention to limit the cycle to two "halves" of equal duration.

Bacon describes an electroplating apparatus and process but the only described current applied in the plating process is a conventional square wave alternating current signal. Thus, Bacon can neither anticipate nor suggest the invention as defined by the claims now pending.

In applying Landau, the Examiner directed attention to pages 22-25 of that publication. While Landau describes, at page 24, application of a single spike at the beginning of a plating cycle, there is no description of a current half cycle having a triangular waveform upon which the spike is superimposed. Thus, Landau cannot suggest and does not disclose the invention defined by the claims now pending.

Reid is the potentially most pertinent of the three publications. Particular emphasis was placed upon the disclosure in Reid in paragraphs [0025], [0029], and [0030]. However, none of these paragraphs describes nor suggests the invention.

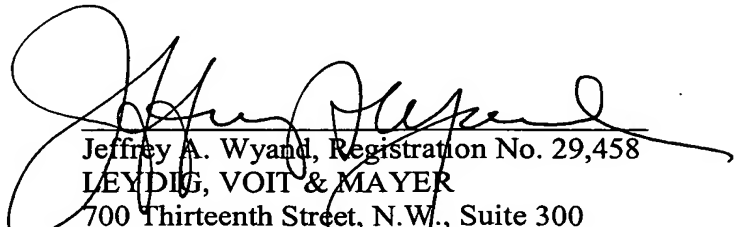
In paragraph [0025], reference is made to a current that may be "constant" or "ramped" and onto which are superimposed short cathodic current pulses. The invention does not employ, in the positive part of the current cycle, a constant current. There is no description in the cited paragraph of Reid concerning what direction the ramp current referred to changes, i.e., whether the current increases or decreases with time. Further, the ramp current described by Reid does not include any negative current portion. Because of these differences, the "second process" mentioned by Reid cannot anticipate nor suggest any pending claim.

In paragraph [0029] of Reid, there is a description of supplying a ramp or a series of small current density steps to adjust current density. The sentence beginning at the foot of the left-hand column of page 4 of Reid and continuing in the right-hand column describes an increase in current density as a function of time, just the opposite of the waveform employed in the invention. Thus, that paragraph of Reid does not disclose the invention now claimed and does not suggest that invention.

Finally, although reference was made to paragraph [0030] of Reid, that paragraph does not describe any current flows or specific waveforms.

It is apparent from the foregoing description of the publications applied in rejecting the examined claims, that no combination of those publications can disclose or suggest the invention as defined by the claims now pending. Accordingly, upon reconsideration, all of those claims should be allowed.

Respectfully submitted,


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